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10/663,106	09/16/2003	Amos E. Cline	02-026	1814

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EXAMINER	
CHORBAJI, MONZER R	
ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/663,106	CLINE, AMOS E.	
	Examiner	Art Unit	
	MONZER R. CHORBAJI	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7 and 11-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7 and 11-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This non-final action is in response to the RCE/Amendment received on 8/20/08

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 7 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaffney (U.S.P.N. 3,278,165).

Regarding claim 7, Gaffney discloses an acoustic energy device (the device shown in figure 18) comprising: a conduit (figure 18:90) with an inlet orifice (left orifice 91shown in figure 18), an outlet orifice (right orifice 91 shown in figure 18), and an expanded flow area (unlabeled area between the left and the right orifices shown in figure 18) between said inlet orifice (left orifice 91shown in figure 18) and said outlet orifice (right orifice 91 shown in figure 18), said conduit (figure 18:90) having a Longitudinal axis (imaginary axis running lengthwise extending between the left and the

right orifices 91 in figure 18) that extends from said inlet orifice to said outlet orifice, wherein said inlet orifice (left orifice 91shown in figure 18) is narrower in diameter (unlabeled diameter of left orifice 91 is smaller than the unlabeled diameter of the unlabeled area between the left and the right orifices shown in figure 18) than said expanded flow area (unlabeled area between the left and the right orifices shown in figure 18) and a flow of said process liquid through said inlet orifice into said expanded flow area results in a turbulent flow (one would recognize that when the moving fluid in the expanded flow area having a large inner diameter, impinges onto unlabeled flow partition where in its center left orifice 91 is located, violent mixing and agitation of the moving fluid occurs, which is considered a turbulent flow); and at least two oscillatory members (figure 18:92) assembled within said conduit (figure 18:90) and spaced a distance apart from one another (oscillatory members 92 in figure 18 are spaced from each a certain longitudinal distance). As to the limitation that the two oscillatory members being assembled within said expanded flow area, Gaffney discloses two oscillatory members 92 in figure 19 being positioned within the unlabeled expanded flow area on the right hand side of the figure in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range (col.1, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the expanded flow area in the embodiment of figure 18 with two oscillatory members next to each other as shown in the embodiment in figure 19 in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range as explained by Gaffney (col.1, lines 65-67).

Gaffney further teaches the following: a flowpath (within unlabeled expanded flow area between orifices 91 in figure 18 where fluid flows from the left hand direction toward the right hand direction as shown by the arrow) extending through said conduit (figure 18:90) from said inlet orifice (left orifice 91shown in figure 18) to said outlet orifice (right orifice 91 shown in figure 18) and between said at least two oscillatory members; a flow partition (unlabeled flow partition where in its center left orifice 91 is located as shown in figure 18), disposed between said at least two oscillatory members (vibratory elements 92 shown in figure 18), said flow partition subdividing said flowpath into a first flowpath (unlabeled liquid flow between left vibratory element and partition) between said flow partition (unlabeled flow partition where in its center left orifice 91 is located as shown in figure 18) and a first oscillatory member (left vibratory element 92 in figure 18) and second flowpath (unlabeled liquid flow between partition and right second vibratory element 92 in figure 18) between said flow partition (unlabeled flow partition where in its center left orifice 91 is located as shown in figure 18) and a second oscillatory member (right vibratory element 92 in figure 18); and wherein said oscillatory members oscillate (col.8, lines 32-33 and col.3, lines 16-20) in said turbulent flow of said process liquid thereby exposing a total volume of said process liquid to said acoustic energy. As to the limitation that the generated acoustic energy emanating in a direction transverse to said flowpath, Gaffney discloses an embodiment in figure 14 where acoustic energy is directed through vibrating interleafing plates 70 in a transverse direction to the liquid flowing through orifice 74 as shown in figure 13 (col.7, lines 9-14) since interleafing plates vibrations result in having a substantial portion of the acoustic

vibrations induced in the fluid (col.7, lines 12-14). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the expanded flow area in the embodiment of figure 18 with the interleafing plates as shown in the embodiment in figure 14 since interleafing plates vibrations result in having a substantial portion of the acoustic vibrations induced in the fluid as explained by Gaffney (col.7, lines 12-14).

Regarding claim 14, Gaffney discloses a method of effecting sonochemical process (col.4, lines 39-50) in a process fluid (for example, organic material-containing waste effluent as described in col.4, lines 49-50), said method comprising the steps of: providing turbulent flow (one would recognize that when the moving fluid in the expanded flow area having a large inner diameter, impinges onto unlabeled flow partition where in its center left orifice 91 is located, violent mixing and agitation of the moving fluid occurs, which is considered a turbulent flow) of a process liquid through a conduit (figure 18:90) having an inlet (left orifice 91shown in figure 18 is considered inlet), and outlet (right orifice 91 shown in figure 18 is considered outlet), and an expanded flow area (unlabeled area between the left and the right orifices shown in figure 18) between said inlet (left orifice 91shown in figure 18) and said outlet (right orifice 91 shown in figure 18), a flowpath (within unlabeled expanded flow area between orifices 91 in figure 18 where fluid flows from the left hand direction toward the right hand direction as shown by the arrow) for said process liquid extending through said expanded flow area; and providing a plurality of oscillatory members (figure 18:92) positioned within said conduit (figure 18:90) that are spaced a distance apart from each other and are prone to vibration (oscillatory members 92 in figure 18 are spaced from

each a certain longitudinal distance; col.3, lines 32-36). As to the limitation that the two oscillatory members being positioned within said expanded flow area, Gaffney discloses two oscillatory members 92 in figure 19 being positioned within the unlabeled expanded flow area on the right hand side of the figure in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range (col.1, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the expanded flow area in the embodiment of figure 18 with two oscillatory members next to each other as shown in the embodiment in figure 19 in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range as explained by Gaffney (col.1, lines 65-67).

Gaffney further teaches the following: providing a flow partition (unlabeled flow partition where in its center left orifice 91 is located as shown in figure 18) between said oscillatory members (left and right vibratory elements 92 in figure 18), so as to divide said flowpath (within unlabeled expanded flow area between orifices 91 in figure 18 where fluid flows from the left hand direction toward the right hand direction as shown by the arrow) into two subdivided flowpaths (first flow path is considered as the unlabeled liquid flow between left vibratory element and partition; second flow path is considered as unlabeled liquid flow between partition and right second vibratory element 92 in figure 18), each subdivided flowpath being between one of said oscillatory members (right vibratory element 92 in figure 18) and said flow partition (unlabeled flow partition where in its center left orifice 91 is located as shown in figure 18); and forcing said turbulently flowing process fluid to flow past said oscillatory members (col.3, lines

32-36), said turbulently flowing process fluid causing said oscillatory members to vibrate (col.4, lines 26-32) thereby producing acoustic energy. As to the limitations that the acoustic energy is passed in a direction transverse to said two subdivided flowpaths, thereby increasing turbulence in said turbulent flow; Gaffney discloses an embodiment in figure 14 where acoustic energy is directed through vibrating interleafing plates 70 in a transverse direction to the liquid flowing through orifice 74 as shown in figure 13 (col.7, lines 9-14) since interleafing plates vibrations result in having a substantial portion of the acoustic vibrations induced in the fluid (col.7, lines 12-14). As to the limitations of exerting forces from shear, compression, and rarefaction resulting from said turbulent flow on a total volume of said process fluid; Gaffney teaches generating shear forces (col.5, lines 20-23) and generating cavitation as well (col.4, lines 54-59) where one recognizes that the cavitation phenomenon results in generating compression and rarefaction forces in the fluid. Also, as to the limitation that the acoustic energy is passed back and forth between the oscillatory members and said flow partition; Gaffney discloses an embodiment in figures 9-10, where both ring 51 (considered a flow partition as part of the housing) and oscillatory member 50 make up the vibratory element (col.6, lines 31-36) in order to create acoustic vibrations in the fluid flowing there along (col.6, lines 32-34). In addition, Gaffney teaches that both ring and oscillatory member are vibrating (col.6, lines 31-32) where one of ordinary skill in the art would recognize that acoustic energy is passed back and forth between the ring and the oscillatory member. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the expanded flow area in the embodiment of

figure 18 with the interleafing plates as shown in the embodiment in figure 14 since interleafing plates vibrations result in having a substantial portion of the acoustic vibrations induced in the fluid as explained by Gaffney (col.7, lines 12-14) and to further provide the expanded flow area in the embodiment of figure 18 with the vibratory element made up of plate and a ring as shown in figures 9-10 in order to create acoustic vibrations in the fluid flowing there along as explained by Gaffney (col.6, lines 32-34).

Regarding claim 11, Gaffney discloses multiple vibratory elements as shown in figure 18 that are arranged in series, one behind another along said flowpath. In addition, Gaffney discloses in one embodiment shown in figure 19, a pair of oscillatory members 92 being positioned within the unlabeled expanded flow area on the right hand side of the figure in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range (col.1, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the expanded flow area in the embodiment of figure 18 with pairs of oscillatory members next to each other as shown in the embodiment in figure 19 in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range as explained by Gaffney (col.1, lines 65-67).

Regarding claims 12-13, Gaffney teaches reducing organic material-containing waste effluent (col.4, lines 48-50 that is considered sanitizing the process liquid) and also teaches homogenizes various process fluids (col.4, line 43).

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gaffney (U.S.P.N. 3,278,165) as applied to claim 14 and further in view of Branson (U.S.P.N. 3,222,221).

Gaffney discloses multiple vibratory elements as shown in figure 18 that are arranged in series, one behind another along said flowpath. In addition, Gaffney discloses in one embodiment shown in figure 19, a pair of oscillatory members 92 being positioned within the unlabeled expanded flow area on the right hand side of the figure in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range (col.1, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the expanded flow area in the embodiment of figure 18 with pairs of oscillatory members next to each other as shown in the embodiment in figure 19 in order to subject the flowing fluid to acoustic vibrations in the sonic or ultrasonic range as explained by Gaffney (col.1, lines 65-67).

Gaffney fails to teach connecting the oscillatory members. Branson discloses treating the ultrasonic cleaning fluid in a tank with multiple electro-acoustical transducers (figure 2:22) that are placed in series next to each other and the transducers are driven by an ultrasonic generator (col.3, lines 70-72) where one would recognize upon reading this passage that transducers 22 are connected in series to an ultrasonic generator for transmission of ultrasonic energy through the walls into the central portion where the ultrasonic energy is concentrated (col.3, lines 72-75 and col. 4, line 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method in Gaffney with the electro-acoustical transducers in order to transmit ultrasonic energy through the walls into the central portion where the ultrasonic energy is concentrated as explained by Branson (col.3, lines 72-75 and col. 4, line 1).

5. Claims 15-16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gaffney (U.S.P.N. 3,278,165) as applied to claims 14 and 7, and further in view of Branson (U.S.P.N. 2,891,176).

Regarding claim 15, Gaffney fails to teach using piezoelectric members and using a pulse generator. Branson discloses an ultrasonic generating device having a cleaning tank (figure 1:10) where a plurality of piezoelectric members (figure 1:20 and 24) are placed in connection with the cleaning tank, since with such an apparatus a more efficient and less costly ultrasonic wave generator than those presently available, is provided (col.2, lines 12-15). Furthermore, Branson discloses oscillators (figure 1:40 and 42 considered as pulse generators) where the oscillators are connected to the piezoelectric transducers through an oscillatory circuit (see the unlabeled electric connections in a tank circuit as shown in figure 1 between oscillators 40 and 42, and piezoelectric members 20 and 24) where pulsing the oscillators (col.1, lines 35-39) since pulsing results in reducing the average power while maintaining the peak power in excess of the predetermined minimum value (col.1, lines 39-41). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method in Gaffney with plurality of pulsing piezoelectric members in order to obtain a more efficient and less costly ultrasonic wave generator than those presently available as explained by Branson (col.2, lines 12-15).

Regarding claim 16, Gaffney fails to teach the use of piezoelectric members and the use of a tank circuit. Branson discloses a plurality of piezoelectric members (figure 1:20 and 24) are in electrical connection (see the unlabeled electric connections as

shown in figure 1 between piezoelectric members 20 and 24 and tank circuit 52, 54, 46, 56, and 60) with tank circuit (col.2, lines 63-67) in order to obtain a more efficient and less costly ultrasonic wave generator than those presently available (col.2, lines 12-15). As to the limitation of using the tank circuit t fly-wheel energy between the piezoelectric members, one would recognize that capacitor 52 of tank circuit stores energy so that this energy is moved back and forth between the two piezoelectric members 20 and 24. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method in Gaffney with plurality of pulsing piezoelectric members in combination with a tank circuit in order to obtain a more efficient and less costly ultrasonic wave generator than those presently available as explained by Branson (col.2, lines 12-15).

Regarding claim 18, Gaffney fails to teach using piezoelectric members and using a pulse generator. Branson discloses a plurality of piezoelectric members (figure 1:20 and 24) placed in connection with the cleaning tank, since with such an apparatus a more efficient and less costly ultrasonic wave generator than those presently available, is provided (col.2, lines 12-15). Furthermore, Branson discloses oscillators (figure 1:40 and 42 considered as pulse generators) where the oscillators are connected to the piezoelectric transducers through an oscillatory circuit (see the unlabeled electric connections in a tank circuit as shown in figure 1 between oscillators 40 and 42, and piezoelectric members 20 and 24) where pulsing the oscillators (col.1, lines 35-39) since pulsing results in reducing the average power while maintaining the peak power in excess of the predetermined minimum value (col.1, lines 39-41). It would have been

obvious to one of ordinary skill in the art at the time of the invention to provide the device in Gaffney with plurality of pulsing piezoelectric members in order to obtain a more efficient and less costly ultrasonic wave generator than those presently available as explained by Branson (col.2, lines 12-15).

Regarding claim 19, Gaffney fails to teach the use of piezoelectric members and the use of a tank circuit. Branson discloses a plurality of piezoelectric members (figure 1:20 and 24) are in electrical connection (see the unlabeled electric connections as shown in figure 1 between piezoelectric members 20 and 24 and tank circuit 52, 54, 46, 56, and 60) with tank circuit (col.2, lines 63-67) in order to obtain a more efficient and less costly ultrasonic wave generator than those presently available (col.2, lines 12-15). As to the limitation of using the tank circuit t fly-wheel energy between the piezoelectric members, one would recognize that capacitor 52 of tank circuit stores energy so that this energy is moved back and forth between the two piezoelectric members 20 and 24. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the device in Gaffney with plurality of pulsing piezoelectric members in combination with a tank circuit in order to obtain a more efficient and less costly ultrasonic wave generator than those presently available as explained by Branson (col.2, lines 12-15).

Response to Arguments

6. Applicant's arguments filed on 8/20/08 have been fully considered but they are not persuasive. However, this rejection is made non-final in order to address newly added claims having new limitations.

The 112, paragraph I rejection issued in the office action dated 4/23/08 has been withdrawn.

Applicants arguments presented on pages 7-10 are moot since they are directed toward the previous rejections presented in the final action dated 4/23/08 and are not relevant to the instant rejections.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MONZER R. CHORBAJI whose telephone number is (571)272-1271. The examiner can normally be reached on M-F 9:00-5:30.

8. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. R. C./

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797